

Filter Fan Unit Return Air Type RA-EC

Technical Concept



Product Description

Exyte Technology Filter Fan Units RETURN AIR (FFU-RA) are suited for the equipment of entire cleanroom facilities.

The FFU-RA is designed for the application in turbulent cleanroom areas and offers the benefit of a reduced return-air volume through conventional return-air areas and cooler of the cleanroom. Therefore, space requirements for the return-air ducts and the raised-floor height are reduced by approximately 50 %.

The FFU-RA is designed for a vertical air-flow with an above located air intake. In both integrated return-air ducts, approximately 50 % of the supply air is lead back directly and uncooled to the fan. The remaining 50 % of the supply air is conveyed through a conventional return-air area into the plenum. Therefore, the conventional return-air must be cooled approximately twice as much (i.e. 4K instead of 2K) in order to reach the same mixed temperature on the filter discharge side.

Special baffle plates on the FFU separate the return-flow area from the supply-air, avoiding a bypass flow.

It is possible to install a prefilter or an AMC-filter on the FFU-RA intake-opening (optional). Only the return-air covers must be exchanged for this purpose.

In order to avoid hot-spots in the cleanroom, internal return-air ducts can be closed with a cover (also optional). As a result the amount of the uncooled return-air is reduced and consequently blown locally into the cleanroom with a lower air-temperature.

A cleanliness class 5.0 to 8.0 according DIN EN ISO 14644-1 can be achieved with the selection of the filter coverage percentage, volume-flow and variable filter-classes.

The brochure provides information about the device design: FFU-RA EC - FFU with EC-motor and advanced control and monitoring possibility.

The product is protected by patent.

Technical Data

Grid size ¹⁾	mm	1 200 × 1 200			
Housing lenght Installation bearing rails	mm	1 132			
Housing width Installation bearing rails	mm	1 132			
Housing height without covers	mm	440			
Housing height with covers	mm	530			
Housing height with prefilter	mm	675			
Housing height with AMC filter	mm	820			
Housing material – standard		Aluminium untreated			
Weight with filter	kg	64			
EC-Motor (IP20)		FFU-RA EC			
Voltage/Phase	V/ph	200–277 / 1			
Frequency	Hz	50/60			
Nominal current	A	1,8– 1,3			
Nominal power	W	370			
Rotation speed max.	1/min	300–1304			
Operation temp. min./max.	°C	0/+40			
Air velocity	m/s	0,30	0,30	0,45	0,45
external differential pressure of system	Pa	20	40	20	40
Air volume flow (supply air)	m ³ /h	1555	1555	2333	2333
Return air internal	m ³ /h	655	915	655	915
Power consumption ²⁾	W	102	117	220	243
Sound power level pressure side ²⁾	dB(A)	54	56	62	63
Sound pressure level in the cleanroom ²⁾					
– 10% coverage	dB(A)	51	53	59	60
– 25% coverage	dB(A)	54	56	62	63
– 50% coverage	dB(A)	57	59	65	66
1) Special size upon request					
2) with H14 filter cell without prefilter/AMC filter					
3) measured with transformer					

Design and Function

The unit consists essentially of the housing **1**, a compact fan unit **3** with inlet-nozzle **5**, motor **4** and the HEPA filter cell **2** with filter frame **9**. Special deflectors avoid a bypass flow of the supply air directly into the return-air. The sound absorber **7** reduces fan noise.

The following additional components at the air-inlet side are available:

- Prefilter **11** for coarse particle separation
- AMC-Filter **12** for the filtration of gaseous contaminations
- Return-air covers **10** for prefilter and AMC filter
- Cover return-air duct **13**

If necessary filter cell class H13 to U17 can be used.

The FFU-motors have sufficient reserve capacity to overcome additional system pressure loss due to, e.g. raised floor, return-air ducts, prefilter or AMC filter.

The FFU-RA-AC is driven by a special developed single-phase external rotor-motor with internally wired thermal contacts for overload protection.

The FFU-RA-EC operates with a electronic commutated external rotor motor.

Dimensions

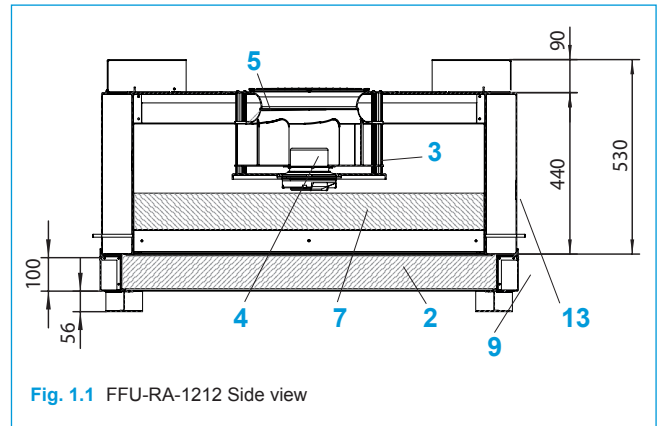


Fig. 1.1 FFU-RA-1212 Side view

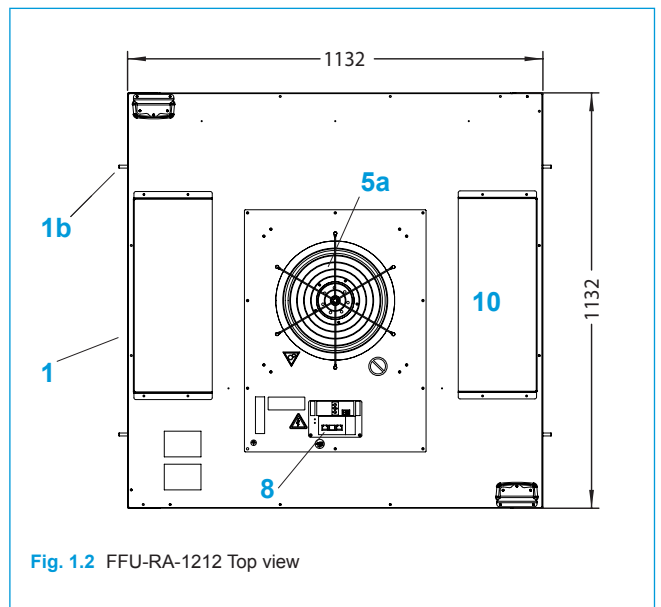


Fig. 1.2 FFU-RA-1212 Top view

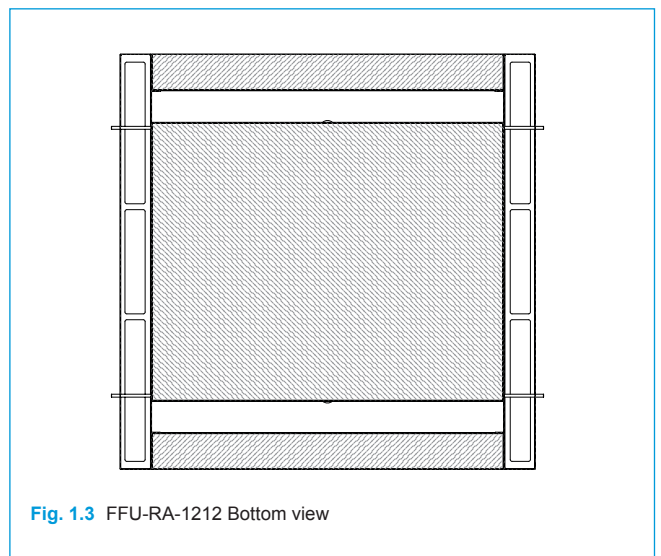


Fig. 1.3 FFU-RA-1212 Bottom view

Device Installation

The installation into the Exyte Technology ceiling system → Ultraflex Grid Ceiling is very simple. The installation can take place from the cleanroom, using the ceiling grid system UFR-55/70-T **14** with bearing rails **6** (Fig .2.2). FFU and filter cell are installable independent from each other from the cleanroom side. The sealing between the housing and the filter cell frame is done with a dry sealant **2b** (Fig. 2.2).

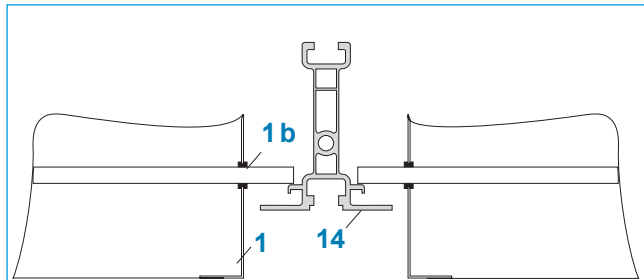


Fig. 2.1 Installation step 1: Insert FFU-RA-housing with support rod **1b** into the ceiling grid.

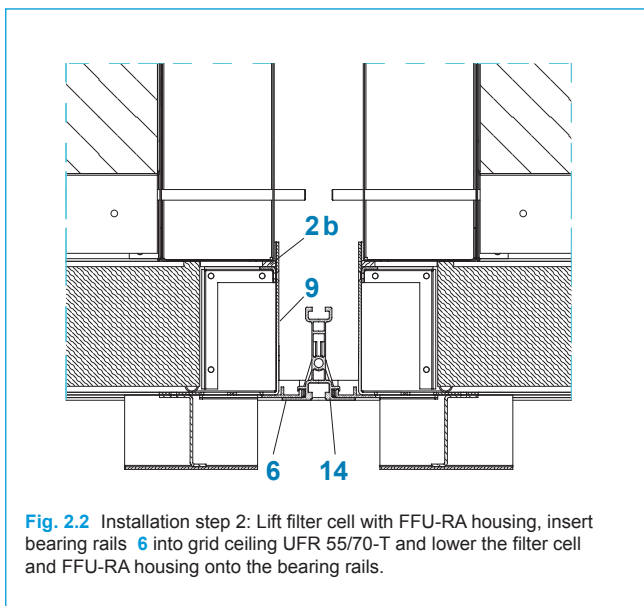


Fig. 2.2 Installation step 2: Lift filter cell with FFU-RA housing, insert bearing rails **6** into grid ceiling UFR 55/70-T and lower the filter cell and FFU-RA housing onto the bearing rails.

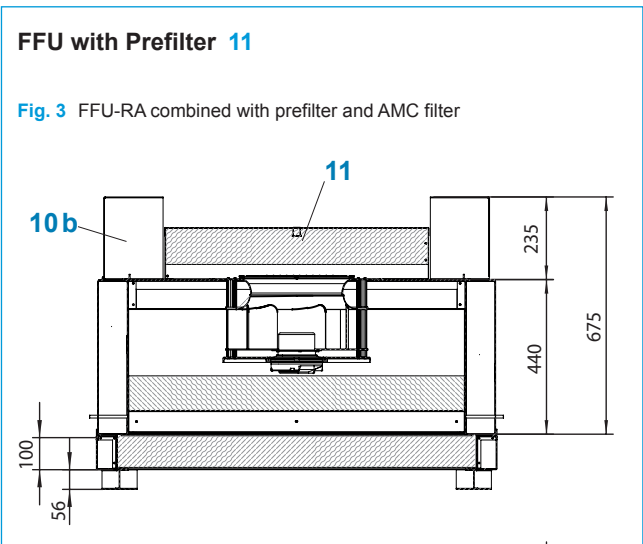
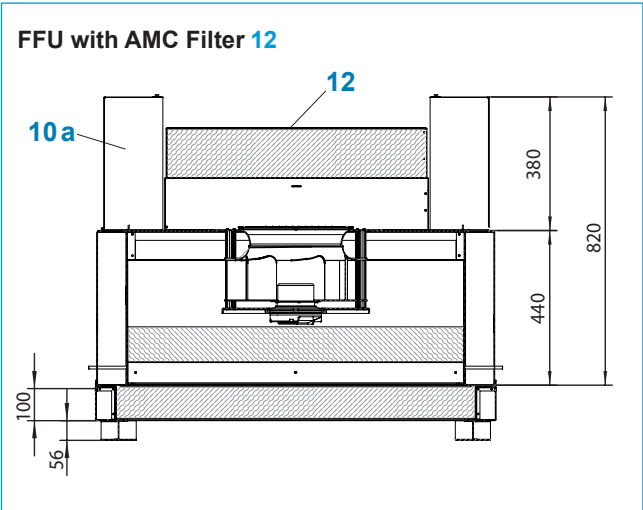


Fig. 3 FFU-RA combined with prefilter and AMC filter

Legend

- | | |
|-------------------------|--|
| 1 Housing | 8 Terminal box |
| 1b Support rod | 9 Filter frame |
| 2 HEPA filter | 10 Return air cover |
| 2b Dry seal | 10a Return air cover AMC Filter |
| 3 Impeller | 10b Return air cover prefilter |
| 4 Motor | 11 Prefilter |
| 5 Inlet nozzle | 12 AMC Filter |
| 5a Air grill | 13 Return air duct |
| 6 Bearing rail | 14 Ceiling grid UFR-55/70-T |
| 7 Sound absorber | |

Control

FFU-RA-EC

Based on LON (Local Operating Network) the FFU-RA are merged to a network through a special bus-system → Control System DC. This enables a simple and individual speed adjustment and monitoring of each unit, even in complex systems with several thousand units.

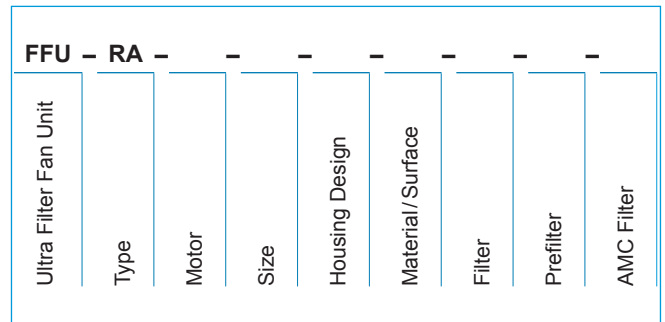
Power Supply

A plug & play cable system is provided for the power supply. Each unit is connected through the existing terminal box 8, minimizing the installation efforts.

Key Features

- Filter fan unit with integrated, uncooled return-air (approx. 50%) for turbulent cleanrooms.
- Air cooling takes place through a heat-exchanger in the on-site building conventional return-air shafts with a higher temperature difference (FFU cooling coils are therefore not necessary)
- System sizes fit in ceiling grid size 1200 mm × 1200 mm, other sizes on request
- Low power consumption, low sound pressure level
- Easy operation, low maintenance efforts
- Applicable for larger cleanroom areas
- Aluminium housing (standard), different designs on request
- Filter cell classes H13 to U17 (standard: H14)
- Installed radial fan: Motor with internally wired thermal contacts.
- FFU-RA EC with electronically commutating external rotor motor, volume flow adjustable through → Control System DC
- Minimized power supply installation effort due to plug & play cable system
- Easy device installation from below (cleanroom side) with bearing rails or adapter frame from Exyte Technology; optionally installation from top (plenum side).
- Optional components: Prefilter, AMC filter, return-air covers

Type Designation

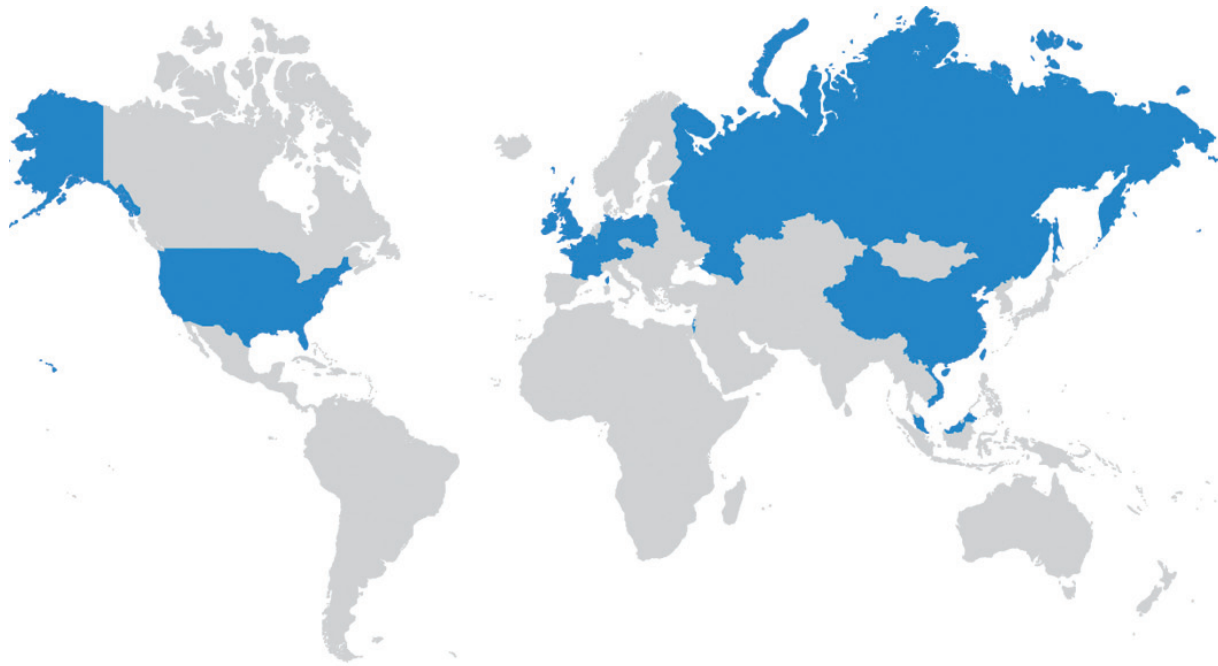


Typ	
RA	Return Air
Motor	
EC/LR	EC-Motor with LON RS485-interface
EC/LF	EC-Motor with LON FTT10A-interface
Size (ceiling grid)	
1212	1200 mm × 1200 mm
Housing Design	
T	Installation into dry-ceiling with bearing rails
So	Installation into other ceiling systems (special design)
Material/Surface	
AU	Aluminium untreated (standard)
AE	Aluminium anodized
HEPA Filter	
H14	Standard filter class
Optional	Filter classes H13, U15, U16, U17
Prefilter	
O	Without
Optional	Filter class G4
G4	Special filter class
AMC Filter	
O	Without
A	With AMC filter

Notes

A large, empty rectangular box with a thin blue border, intended for taking notes. The box is currently blank.

Local Support Wherever You Need Us



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